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velopment and function of muscles in frog embryos. The following results may be noted:—

1. All muscles develop normally, but less rapidly in the nerveless embryos than in the normal.

2. In normal embryos the nervous connection with muscles precedes slightly the development of contractility in the muscles.

3. All muscles,—cardiac, axial, and appendicular,—differentiate independently of nervous connection.

4. Embryonic cardiac muscles will contract spontaneously and rhythmically without nervous control; axial muscles will not contract spontaneously but will respond to direct mechanical stimulation; appendicular muscles are dependent on the nervous system for stimulation until late in development.

CULTIVATION OF TISSUES IN ALIEN SERA

Lambert and Hanes (*Jour. Exp. Med.*, Aug., 1911), following up many unsuccessful efforts to secure growth of animal tissues in species different from that from which they were derived, have reported undertaking to grow such tissues outside the body in plasma from alien species. They found that rat sarcoma may be cultivated in mouse and guinea pig plasma for 30 days or more; in rabbit plasma, more slowly for 12 days; in dog plasma, not at all; in human plasma (the fibrin was liquified), the cells outwandered and formed giant cells after 4 to 6 days. Mouse sarcoma and tissues of rat spleen were used with much the same results. Transplantation back to homologous serum was the test of the retention of reproductive vitality.

SELECTIVE MATING IN PARAMECIA

In an elaborate paper (*Jour. Exp. Zool.*, July, 1911) Prof. H. S. Jennings gives the results of experiments in assortative mating among *Paramecia*, and its products. It is impossible to do justice in a brief abstract to the luminous presentation in this paper, but the main results (parts of which corroborate the work of Pearl and others) may be summarized as follows:—

1. In cultures consisting of progeny of one individual or of a mixture of races, it is the rule that the members of conjugating pairs

are smaller and less variable than the non-conjugants in the same cultures.

2. This difference is only a temporary physiological one, and has no permanent effect on the stock, since the small conjugants grow after separation until as large as their larger relatives.

3. There is a definite correlation in size between the members of pairs,—larger mating with larger, and smaller with smaller. This tends to prevent crossing of species of different size, and of the different sized races of the same species,—and thus to keep the strains distinct and to preserve the existing differentiations.

4. Owing possibly to the slower fission of the daughters of conjugants the progeny of conjugants are for a few generations a little larger than those of the members of the same race that have not conjugated. This seems transient.

5. The progeny of conjugants are also somewhat more variable than progeny of equivalent non-conjugants.

6. Hereditary differences may arise as a result of conjugation of individuals derived from a single individual; and sometimes even between the descendants of the 2 members of a pair.

EXPERIMENTS ON WHEAT RUST IN NORTH DAKOTA

In the Botanical Gazette (Sept., 1911) F. J. Pritchard makes a preliminary report on the origin and dissemination of the black rust of cereals (*Puccinia graminis*) in North Dakota. He reviews the literature of observation and experiment upon the subject and reports his own experiments with inoculation. He believes that the rust passes readily from the cereals to the barberry; that the aecidiospores and uredospores are probably not carried long distances by wind; that *P. graminis* does not appear to spread to the wheat by way of the grasses; that the form affecting wheat, that of barley, and that of rye and oats are apparently distinct biologically; that uredospores and the mycelium of the stalk do not survive winter conditions in North Dakota; that the grains of wheat are often infested by teleutospores which may in the spring pass thru a kind of palmella-like stage, and together with living mycelia in the grains infect the new, growing plant.